

Materials Science

AN INVESTIGATION OF THE THERMAL DEGRADATION OF POLYSTYRENE

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Resource recovery of highly valued feedstock materials from plastic waste is becoming increasingly important. Polystyrene poses a specific challenge in this arena. The thermal degradation of polystyrene produces low molecular weight products such as dimer and trimer in addition to monomer. Dimer and trimer are typically formed via backbiting and hydrogen abstraction reactions during thermal degradation. These undesired pathways produce mid-chain radicals which undergo beta scission. It was hypothesized that the introduction of a highly ordered, mesoporous catalyst would inhibit the undesired pathways thus enhancing styrene selectivity. Our initial results indicate that catalytic degradation actually occurs slower than neat pyrolysis. However, an increase in styrene selectivity was observed during catalytic degradation. In addition, dimer and trimer formation was not detected during catalytic degradation.